

What is claimed is:

1. A conductive ink composition, comprising a carboxylic acid- or anhydride-functional aromatic vinyl polymer and a conductive material selected from the group consisting of conductive particulate materials, conductive flake materials, and combinations thereof.
2. A conductive ink composition according to claim 1, comprising a conductive flake material that has an aspect ratio of at least about 5:1.
3. A conductive ink composition according to claim 1, wherein the aromatic vinyl polymer is a copolymer of styrene.
4. A conductive ink composition according to claim 1, wherein the aromatic vinyl polymer is a copolymer of maleic acid or maleic anhydride.
5. A conductive ink composition according to claim 1, wherein the ink composition is aqueous.
6. A conductive ink composition according to claim 1, wherein the aromatic vinyl polymer has an acid number from about 0.5 to about 100 mg KOH/g.

7. A conductive ink composition according to claim 1, wherein the conductive material consists essentially of a member selected from the group consisting of conductive metal oxide materials and combinations thereof.
8. A conductive ink composition according to claim 1, comprising a member selected from the group consisting of carbon black, graphite, and combinations thereof.
9. A conductive ink composition according to claim 8, comprising carbon black, wherein the aromatic vinyl polymer has an acid number from about 0.5 to about 15 mg KOH/g.
10. A conductive ink composition according to claim 1, comprising at least one further polymer.
11. A conductive ink composition according to claim 8, wherein the further polymer comprises a member selected from the group consisting of acrylic polymers, cellulosic polymers, poly(vinyl butyral) polymers, maleic-modified rosin esters, polyamides, styrene-allyl alcohol copolymer, and combinations thereof.
12. A conductive ink composition according to claim 1, wherein the conductive material comprises a member selected from the group consisting of carbon black, conductive metal oxide particulate materials, and combinations thereof.

13. A conductive ink composition according to claim 1, wherein the conductive material comprises a particulate material coated with a member selected from the group consisting of antimony tin oxide, indium tin oxide, and combinations thereof.

14. A conductive ink composition according to claim 1, wherein the conductive material comprises a member selected from the group consisting of conductive metal particulate materials, conductive metal alloy particulate materials, particulate materials coated with conductive metals, particulate materials coated with conductive metal alloys, conductive metal flake materials, conductive metal alloy flake materials, flake materials coated with conductive metals, flake materials coated with conductive metal alloys, and combinations thereof.

15. A conductive ink composition according to claim 1, wherein the conductive material comprises a member selected from the group consisting of metallic silver powders, metallic copper powders, bronze powders, metallic silver flakes, metallic copper flakes, bronze flakes, particulate and flake materials coated with metallic silver, particulate and flake materials coated with metallic copper, particulate and flake materials coated with bronze, and combinations thereof.

16. A conductive ink composition according to claim 1, comprising a conductive flake material that has an aspect ratio of at least about 10:1.

17. A conductive ink composition according to claim 1, comprising a conductive flake material that has an aspect ratio of at least about 50:1.
18. A conductive ink composition according to claim 1, comprising a conductive material selected from the group consisting of graphite, carbon fiber, mica coated with antimony tin oxide, mica coated with indium tin oxide, mica coated with a combination of antimony tin oxide and indium tin oxide, mica having intermediate layer of titanium dioxide and an outer layer of antimony tin oxide and/or indium tin oxide, and combinations thereof.
19. A conductive ink composition according to claim 1, comprising a weight ratio of conductive particulate material to conductive flake material that is from about 1:1 to about 2:3.
20. A method for printing an electrically conductive ink, comprising applying to a substrate a conductive ink comprising a carboxylic acid- or anhydride-functional aromatic vinyl polymer and a conductive material selected from the group consisting of conductive particulate materials, conductive flake materials, and combinations thereof by flexographic printing or gravure printing.
21. A method according to claim 20, wherein the ink is applied in an array.

22. A method according to claim 20, wherein the substrate having electrically conductive print is formed into a package.
23. A method according to claim 22, wherein the electrically conductive print is on the inside of the package.
24. A method according to claim 23, wherein the electrically conductive print is a part of exterior graphics on the package.
25. A method according to claim 21, wherein the conductive material is selected from the group consisting of particulate materials coated with antimony tin oxide, particulate materials coated with indium tin oxide, particulate materials coated with a combination of antimony tin oxide and indium tin oxide, micas coated with antimony tin oxide, micas coated with indium tin oxide, micas coated with a combination of antimony tin oxide and indium tin oxide, micas having intermediate layer of titanium dioxide and an outer layer of antimony tin oxide micas having intermediate layer of titanium dioxide and an outer layer of indium tin oxide, micas having intermediate layer of titanium dioxide and an outer layer of a combination of antimony tin oxide and indium tin oxide, and combinations thereof and wherein the conductive ink has a color other than black.

26. A method according to claim 25, wherein the conductive material comprises at least one of the particulate materials of the group and at least one of the micas of the group.
27. An article, comprising a printed layer of an ink comprising a carboxylic acid- or anhydride-functional aromatic vinyl polymer and a conductive material selected from the group consisting of conductive particulate materials, conductive flake materials, and combinations thereof.
28. An article according to claim 27, wherein the printed layer has a thickness of 5 microns or less.
29. An article according to claim 27, wherein the article comprises an RFID tag comprising as the printed layer an antenna.
30. An article according to claim 27, wherein said article comprises an electrostatic detection device comprising said printed layer.
31. An article according to claim 27, wherein said article comprises an anti-static solid area printed with said ink.
32. An article according to claim 27, wherein said article comprises an anti-static array printed with said ink.

33. An article according to claim 27, wherein the design is coated with a protective coating.
34. An article according to claim 27, wherein the design comprises at least one color other than black.
35. An article according to claim 27, wherein the design is printed in half-tone over a conductive primer coat.
36. A method of preparing an electrical circuit, comprising a step of printing a conductive ink comprising a carboxylic acid- or anhydride-functional aromatic vinyl polymer and a conductive material selected from the group consisting of conductive particulate materials, conductive flake materials, and combinations thereof to produce a conductive element of said circuit, wherein said printing is carried out by a gravure printing or flexographic printing.

37. A method of preparing an electrical component, comprising a step of providing a part of said component by gravure printing or flexographic printing of a conductive ink comprising a carboxylic acid- or anhydride-functional aromatic vinyl polymer and a conductive material selected from the group consisting of conductive particulate materials, conductive flake materials, and combinations thereof.

38. A method according to claim 37, wherein the electrical component is a member selected from the group consisting of resistors, capacitors, inductors, batteries, antennae, and circuitry.

39. An electrical circuit prepared by printing at least a portion of said circuit by gravure printing or flexographic printing of a conductive ink comprising a carboxylic acid- or anhydride-functional aromatic vinyl polymer and a conductive material selected from the group consisting of conductive particulate materials, conductive flake materials, and combinations thereof.

40. An electrical component, said component comprising an element printed with a conductive ink comprising a carboxylic acid- or anhydride-functional aromatic vinyl polymer and a conductive material selected from the group consisting of conductive particulate materials, conductive flake materials, and combinations thereof.



41. An electrical component according to claim 40, wherein said element comprises an interconnection within said component.

42. An electrical component according to claim 40, wherein said element comprises a conductive layer of said component.